UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/865,797	05/25/2001	Michael A. Corrigan	IO-1058-US	4375

24923 7590 06/27/2003

PAUL S MADAN
MADAN, MOSSMAN & SRIRAM, PC
2603 AUGUSTA, SUITE 700
HOUSTON, TX 77057-1130

EXAMINER
SAN MARTIN, EDGARDO

ART UNIT	PAPER NUMBER
2837	

DATE MAILED: 06/27/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/865,797	CORRIGAN ET AL.	
	Examiner	Art Unit	
	Edgardo San Martin	2837	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *27 May 2003* .

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-28,30 and 32-60* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-28,30 and 32-60* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

1. Claims 1 – 3, 5, 9, 12, 13, 48, 50, 52, 56 and 59 are rejected under 35 U.S.C. 103(a) as being unpatentable over Crump et al. (US 3,911,388) in view of Wassell (US 4,779,852).

With respect to Claims 1 and 48, Crump et al. teach an apparatus for sensing seismic waves in the earth (Fig.3), the apparatus comprising a housing (Fig.3, Item 41), one seismic sensor (Fig.3, Item 51) disposed in the housing; and at least one isolator (Fig.4, Items 109 and111) coupled to the one or more seismic sensors for isolating the seismic sensor from vibrations induced in the housing (Col.3, Lines 25 – 29, Col.7, Lines 32 – 61), but fail to disclose wherein the vibrations induced in the housing are high-g shocks.

On the other hand, Wassell teaches an apparatus for sensing seismic waves in the earth (Fig.1A), the apparatus comprising a housing, one seismic sensor disposed in the housing; and at least one isolator coupled to the one or more seismic sensors for

isolating the seismic sensor from high-g shock induced in the housing (Col.2, Line 28 – Col.3, Line 6 and Col.6, Lines 49 – 58).

It would have been obvious to a person with ordinary skill in the art to employ the Wassell isolator with the Crump et al. seismic sensor design because the isolator would protect the sensors from severe shocks and vibrations increasing the utility life of the equipment, and also improving the measurements of the desired seismic signals.

With respect to Claims 2 and 50, Crump et al. teach wherein the at least one isolator is disposed to provide isolation from the induced vibrations in at least one predetermined direction (Fig.4).

With respect to Claim 3, Crump et al. teach further comprising an electronics package (Fig.4, Item 81) disposed in the housing and wherein the at least one sensor form at least a portion of the electronic package (Fig.4).

With respect to Claims 5 and 52, Crump et al. teach wherein the at least one isolator further comprises a layer of silicone rubber (Fig.4, Items 109 and 111; Col.3, Lines 25 – 29 and Col.5, Lines 27 – 30).

With respect to Claims 9 and 56, Crump et al. teach wherein the sensor is an accelerometer (Col.4, Line 65 +).

With respect to Claims 12, 13 and 59, Crump et al. teach further comprising a cap (Fig.3, Item 43) coupled to the housing, the cap having a feed through for providing conductor (Fig.3, Item 15) access to the seismic sensor, and wherein the cap and housing are coupled to form a sealed sensor module.

2. Claims 4, 6, 7, 51, 53 and 54 is rejected under 35 U.S.C. 103(a) as being unpatentable over Crump et al. (US 3,911,388) in view of Wassell (US 4,779,852), and further in view of Carpenter et al. (US 5,463,193).

With respect to Claims 4 and 51, Crump et al. and Wassell teach the limitations discussed in the previous rejection, but fail to disclose wherein the at least one predetermined direction further comprises directions along three translational axes and three angular axes.

On the other hand, Carpenter et al. teach a vibration isolation system wherein the isolation system isolate a device in directions along three translational axes and three angular axes (Fig.1; Col.1, Lines 32 – 58).

It would have been obvious to a person with ordinary skill in the art to employ the Carpenter et al. vibration isolation configuration with the Crump et al. and Wassell sensor system because the sensor would be isolated from vibration coming from all direction making the sensor more sensitive to the seismic vibration, making the sensor system more reliable.

With respect to Claims 6 and 53, Carpenter et al. teach a vibration damper comprising polyurethane (Col.2, Line 33 +).

With respect to Claims 7 and 54, the Examiner takes Official Notice that it is well known in the art to employ silicone rubber and polyurethane foam as vibration dampers as disclosed by Crump et al. and Carpenter et al.

It have been obvious to a person with ordinary skill in the art to employ a vibration isolator comprising a layer of silicone rubber and a second layer of polyurethane foam because they are very well known vibration dampers elements and would be obvious to employ them in combination to increase the vibration damping effect.

3. Claims 8, 14 -16, 18, 20, 24 - 26, 35 – 37, 39, 45 - 47, 49, 55 and 60 are rejected under 35 U.S.C. 103(a) as being unpatentable over Crump et al. (US 3,911,388) in view of Wassell (US 4,779,852), and further in view of Hall, Jr. (US 4,163,206).

With respect to Claims 8, 15, 35, 36, 49 and 55, Crump et al. and Wassell teach the limitations discussed in a previous rejection, but fail to disclose further comprising an inertial mass operatively associated with the sensor.

Nevertheless, Hall, Jr. teaches a seismic detector comprising an inertial mass (Fig.2, Item 36) operatively associated with the sensor (Fig.2, Item 15).

It would have been obvious to a person with ordinary skill in the art to employ the Hall, Jr. inertial mass with the Crump et al. and Wassell sensor because of the nature of an accelerometer; an inertial mass is needed in some designs for the accelerometer to work properly.

With respect to Claims 14, 26, 47 and 60, Hall, Jr. teaches wherein the sealed sensor module is hermetically sealed (Col.4, Lines 19 – 21).

With respect to Claims 16, 18 and 37, Crump et al. teach wherein the at least one isolator is disposed to provide isolation from the induced vibrations in at least one predetermined direction (Fig.4).

With respect to Claims 20 and 39, Crump et al. teach wherein the at least one isolator further comprises a layer of silicone rubber (Fig.4, Items 109 and 111; Col.3, Lines 25 – 29 and Col.5, Lines 27 – 30).

With respect to Claims 24, 25, 45 and 46, Crump et al. teach further comprising a cap (Fig.3, Item 43) coupled to the housing, the cap having a feed through for providing conductor (Fig.3, Item 15) access to the seismic sensor, and wherein the cap and housing are coupled to form a sealed sensor module.

4. Claims 10, 11, 57 and 58 are rejected under 35 U.S.C. 103(a) as being unpatentable over Crump et al. (US 3,911,388) in view of Wassell (US 4,779,852) and further in view of Alft et al. (US 6,315,062).

Crump et al. teach the limitations discussed in a previous rejection, but fail to disclose wherein the one or more accelerometer sensors are three accelerometers disposed to provide three orthogonal axes of sensitivity, and wherein the one or more accelerometers are MEMS accelerometers.

On the other hand, Alft et al. teach a sensor system employing one or more accelerometer sensors that are three accelerometers disposed to provide three orthogonal axes of sensitivity, and wherein the one or more accelerometers are MEMS accelerometers (Col.9, Lines 4 – 40).

It would have been obvious to a person with ordinary skill in the art to employ the Alft et al. multiple MEMS accelerometers with the Crump et al. and Wassell design because the MEMS accelerometers are smaller in size and could be placed at any adequate place without increasing the size of the element.

5. Claims 17, 23 and 42 - 44 are rejected under 35 U.S.C. 103(a) as being unpatentable over Crump et al. (US 3,911,388) in view of Wassell (US 4,779,852) and Hall, Jr. (US 4,163,206), and further in view of Alft et al. (US 6,315,062).

Crump et al., Wassell and Hall, Jr. teach the limitations discussed in a previous rejection, but fail to disclose wherein the one or more accelerometer sensors are three accelerometers disposed to provide three orthogonal axes of sensitivity, and wherein the one or more accelerometers are MEMS accelerometers.

On the other hand, Alft et al. teach a sensor system employing one or more accelerometer sensors that are three accelerometers disposed to provide three orthogonal axes of sensitivity, and wherein the one or more accelerometers are MEMS accelerometers (Col.9, Lines 4 – 40).

It would have been obvious to a person with ordinary skill in the art to employ the Alft et al. multiple MEMS accelerometers with the Crump et al., Wassell and Hall, Jr. design because the MEMS accelerometers are smaller in size and could be placed at any adequate place without increasing the size of the element.

6. Claims 19, 21, 22, 38, 40 and 41 are rejected under 35 U.S.C. 103(a) as being unpatentable over Crump et al. (US 3,911,388) in view of Wassell (US 4,779,852) and Hall, Jr. (US 4,163,206), and further in view of Carpenter et al. (US 5,463,193).

With respect to Claims 19 and 38, Crump et al., Wassell and Hall, Jr. teach the limitations discussed in the previous rejection, but fail to disclose wherein the at least one predetermined direction further comprises directions along three translational axes and three angular axes.

On the other hand, Carpenter et al. teach a vibration isolation system wherein the isolation system isolate a device in directions along three translational axes and three angular axes (Fig.1; Col.1, Lines 32 – 58).

It would have been obvious to a person with ordinary skill in the art to employ the Carpenter et al. vibration isolation configuration with the Crump et al., Wassell and Hall, Jr. sensor system because the sensor would be isolated from vibration coming from all direction making the sensor more sensitive to the seismic vibration, making the sensor system more reliable.

With respect to Claims 21 and 40, Carpenter et al. teach a vibration damper comprising polyurethane (Col.2, Line 33 +).

With respect to Claims 22 and 41, the Examiner takes Official Notice that it is well known in the art of vibration dampers to employ multiple layers of damping materials or combination of them.

It would have been obvious to a person with ordinary skill in the art as to employ the Crump et al. silicone rubber in combination with the Carpenter et al. polyurethane foam because they are well known damping materials and would increase the efficiency of the element to damp vibrations.

7. Claims 27, 28, 30 and 32 – 34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Crump et al. (US 3,911,388) in view of Hall, Jr. (US 4,163,206), and further in view of Alft et al. (US 6,315,062).

With respect to Claims 27 and 30, Crump et al. and Hall, Jr. teach the a seismic sensor module comprising a module case, a sensor assembly coupled to the module case, the sensor assembly including one or more seismic sensors, and an inertial mass coupled to the sensor assembly for providing noise reduction in the sensor module, but fail to disclose wherein the one or more sensors are three accelerometers disposed to provide three orthogonal axes of sensitivity, and wherein the one or more accelerometers are MEMS accelerometers.

On the other hand, Alft et al. teach a sensor system employing one or more accelerometer sensors that are three accelerometers disposed to provide three orthogonal axes of sensitivity, and wherein the one or more accelerometers are MEMS accelerometers (Col.9, Lines 4 – 40).

It would have been obvious to a person with ordinary skill in the art to employ the Alft et al. multiple MEMS accelerometers with the Crump et al. design because the

MEMS accelerometers are smaller in size and could be placed at any adequate place without increasing the size of the element.

With respect to Claim 28, Hall, Jr. teaches wherein the inertial mass is of metal (Col.4, Lines 41+).

With respect to Claims 32 and 33, Crump et al. teach further comprising a cap (Fig.3, Item 43) coupled to the housing, the cap having a feed through for providing conductor (Fig.3, Item 15) access to the seismic sensor, and wherein the cap and housing are coupled to form a sealed sensor module.

With respect to Claim 34, Hall Jr. teaches wherein the sealed sensor module is hermetically sealed (Col.4, Line 19 – 21).

Response to Arguments

8. Applicant's arguments with respect to the claims have been considered but are moot in view of the new ground(s) of rejection. The Examiner considers that the obvious incorporation of Wassell teachings to the cited prior art, as discussed above, disclosed the limitations described by the claimed subject matter. Furthermore, the Examiner considers that the patent to Wassell contains the motivation and/or suggestion for a person with ordinary skill in the art to combine the cited references, as discussed above.

Conclusion

9. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Contact Information

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Edgardo San Martin whose telephone number is (703) 308-1050. The examiner can normally be reached on 8:00AM - 5:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert Nappi can be reached on (703) 308-3370. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 305-3431 for regular communications and (703) 305-3431 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703)308-0956.

Edgardo San Martín
Patent Examiner
Art Unit 2837
Class 181
June 19, 2003

ROBERT E. NAPPI
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800